

Scenario

We consider a process performed by an IT helpdesk that handles requests from clients. The clients are employees of a company. There are about 500 employees in total. A *request* may be an IT-related problem that a client has, or an access request (e.g. requesting rights to access a system). Requests need to be handled according to their type and their priority ("critical", "urgent" or "normal"). The current process works as follows. A client calls the help desk or sends an e-mail in order to make a request. The Help Desk is staffed with 5 "Level-1 support staff" who, typically, are junior people with less than 12 months experience, but are capable of resolving known problems and simple requests. When the Level-1 employee does not know the resolution to a request, the request is forwarded to a more experienced "Level-2" employee (there are three such Level-2 employees). The Level-2 employee evaluates and prioritizes the request for completion. When prioritizing the request, the Level-2 employee takes into account the priority of the job given by the client, but also the backlog of other jobs that need to be handled.

After some delay, the request is researched and a resolution is developed and sent to the Level-1 employee. Upon receipt, the resolution is sent (after a delay) to the client who, after some additional delay, tests the resolution. The client notifies the outcome of the test to the Level-1 employee via e-mail. If the request is correct or is fixed, it is marked as complete and the process ends. If the request is not correct or is not fixed, it is resent to Level-2 support for further action and goes through their process again.

Requests are registered in a "job tracking system". The job tracking system allows Help Desk employees to record the details of the request, the priority level and the name of the client who generated the request. When a request is registered, it is marked as "open". When it is moved to level 2, it is marked as "forwarded to level 2" and when the resolution is sent back to "Level 1" the request is marked as "returned to level 1". Finally, when a request is resolved, it is marked as "closed". Every request has a unique identifier. When a request is registered, the job tracking system sends an e-mail to the client. The e-mail includes a "request reference number" that the client needs to quote when asking questions about the request.

The helpdesk receives approximately 100 new requests per working day.

The current process is known to be error-prone. The most frequent types of errors include:

- Many requests take too long to be processed. Clients need to call often to remind the helpdesk that their requests are still unresolved

- When the client asks what is the status of a given request, oftentimes the helpdesk gives an incorrect answer. In other words, the Level-1 helpdesk staff are unable to accurately determine what is the status of every request.
- When reviewing the list of open requests, the Level-1 staff often find many requests marked as "open", but these requests are in fact already resolved.

Tasks

Task 1 [10 points]. Model the above "as is" process in BPMN. Keep in mind that the purpose of this BPMN diagram is to serve as a means of communication between the employees in the helpdesk, the clients of the helpdesk, and the business and IT analysts who have to re-design and automate this process.

Task 2 [5 points]. Classify the activities in this process into three categories: "value adding" (VA), business value-adding (BVA) and non-value-adding (NVA).

Task 3 [15 points]. Calculate the cycle time and the cycle time efficiency of the "as is" process assuming that:

- Submitting and registering a new request takes 5 minutes on average.
- Checking if a request is "known" takes between 5 and 15 minutes, with an average of 10 minutes. In 20% of cases the request is known. In this case, it takes between 2 and 10 minutes (average 5 minutes) for the Level-1 staff to communicate the resolution to the client.
- Level-2 staff take between 5 and 60 minutes to evaluate a request (when it is received from Level-1). The average for this operation is 20 minutes.
- Level-2 staff take 5 minutes to prioritize a request.
- The time between a request is evaluated and prioritized by Level-2 staff, and the time when the request is "researched" is between 1 and 120 hours, with an average of 20 hours
- The time required to request and resolve a request is between 20 minutes and 40 hours, with an average of 2 hours
- The time to write the resolution to a request is between 5-60 minutes with an average of 20 minutes
- Once a Level-2 staff has written the resolution of a request, it takes between 1 and 120 hours (average: 20 hours) before a the request is "fetched" from the job tracking system by a Level-1 staff
- It takes between 5 and 60 minutes (average: 20 minutes) for a Level-1 staff to send to the client a problem resolution previously written by a Level-2 staff
- It takes between 1 and 120 hours (average: 20 hours) between the moment a resolution is sent by the Level-1 staff , and the moment the resolution is tested by the client.
- It takes the client between 5 and 60 minutes (average: 10 minutes) to e-mail the test results to the Level-1 staff.
- In 20% of cases the request is not resolved, and it needs to be forwarded to Level-2 again.

- The theoretical cycle time should be calculated by counting only value-adding and business-value-adding activities (i.e. excluding non-value-adding activities and waiting times). The cycle time efficiency is the theoretical cycle time divided by the total cycle time.

Task 4 [10 points]. For Masters of ETM only. Write an issue register and a list of performance objectives for this process.

Task 5 [5 points]. Propose a set of changes to improve this process. Give a justification for each change.

Task 6 [5 points]. Draw a "to-be" model that incorporates your proposed changes

Task 7. [10 points] For Masters of IT/SE only. Answer the following questions:

- 7.a. What datatypes would you need to define in order to automate the to-be process using YAWL? You do not need to write the XML Schemas for these datatypes. You only need to write what are the name(s) of the type(s) that need to be defined, and what are the main XML elements that need to be defined in this datatype.
- 7.b. What XPath expressions would you need to write? You do not need to write the exact XPath expressions, but instead, just explain which XPath expressions need to be defined, and for each of them, briefly explain when should this XPath expression evaluate to true.
- 7.c. What resource allocation policies would you assign to each task in the to-be process if you had to implement this process using YAWL?

How to Submit

You can submit your solution on paper, or as a single zip file in a memory stick.

If you submit an electronic file, please make sure that the instructor has received your file(s) BEFORE you leave the examination room. Also, make sure that you write your name in your solution.

Acknowledgment

The scenario used in this exam is inspired from a scenario by Sue Conger, Handbook of Business Process Management, Volume 1, Chapter 6 ("Six Sigma and Business Process Management").